

Rev. Mr. Coventry

AN INAUGURAL
ORATION,
ON THE
PROGRESS AND IMPORTANCE
OF THE
MATHEMATICAL SCIENCES.

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Delivered at Princeton on the evening preceding the
Annual Commencement 1788,

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I WILL not endeavour, as is often done in addresses of this kind, to prepossess my audience in favour of the speaker, by pleading want of abilities to perform my task. Protestations of this nature are frequently insincere, and generally meet with the reception they deserve. Nor will

will I entertain you with eulogies on the Founders, the Trustees, and the Faculty of the College—for their works praise them.

My intention is to make a few general remarks on the Origin, Progress and chief Promoters of the Mathematical Sciences, the subjects of my profession, and on the Importance and Advantages of those Sciences.

I MUST beg leave, however, to make one apology, which the audience I have the honor to address, will not think either unreasonable or improper. It is: that, being accustomed for several years to a study in which the fewest and simplest terms are used, I cannot be supposed to possess the qualifications or to act the part of the orator. I hope, therefore, you will be pleased to dispense with those ornaments

ments which usually distinguish inaugural orations.

I REMARK, I. That the necessities of society gave birth to the Arts and Sciences.

THE Author of Nature has wisely ordained that man should owe the preservation of his life, and the enjoyment of happiness, to his own activity and ingenuity. In the infancy of society, the wants of the individual are few, and are procured without much exertion of the mind. The genius of Newton, had he been born among the Indians, instead of discovering the laws of the universe, would have been limited to the improvement of the instruments of hunting, or to the construction of commodious wigwams. In proportion to the increase of population, those means of subsistence

ence which Nature throws in the way, diminish in number, and become more difficult to be obtained. After the resources from the spontaneous productions of the earth, from game and from the taming of cattle, become too scanty for his subsistence, man is driven to the cultivation of the soil, and to the invention of instruments necessary for this purpose. As some are more industrious than others, and as every one has a right to the fruits of his own industry, society, when arrived at the agricultural state, makes a partition of their lands. In process of time, the field of every family is distinguished, where nature has not done it, by artificial marks. As these are liable to be swept away by inundations, or defaced by time, or to be moved by a covetous neighbour, it is found necessary to determine the boundaries of farms by mensuration.

Such

Such must have been the origin of Geometry. *

THIS account is perfectly consonant with history. Aristotle, Herodotus and Strabo concur in testifying that the Mathematics took their rise in Egypt—a country subjected to an annual inundation. From Egypt they were transplanted into Greece, first by Thales the Milesian, about five hundred and eighty-four years before the christian æra, and afterwards by Pythagoras and Plato. The Grecian philosophers, by abstracting Geometry from Matter, and by inventing many new and useful theorems, greatly

* As to Arithmetic, which is so necessary to man that it must have made its appearance on the rudest stage of society, the reader may consult the *Account of the life, writings and inventions of John Napier of Merchiston*, the joint work of the Right Honorable the Earl of Buchan and of the author, where the subject is treated at considerable length.

ly improved this science, or rather created it, for it seems to have been only an art in the hands of their masters. This leads me to observe,

II. THAT it is in civilized society where the Arts and Sciences receive improvement and perfection.

IN the savage state, man has to wage continual war with the elements and with ferocious animals. He thinks of no other arts, therefore, but such as are necessary for his defence, and for procuring him his precarious subsistence. It is not until society has made considerable progress in civilization, that a part of the community obtains an exemption from labor, which is absolutely necessary to the successful cultivation of science. When his necessities do not prompt him to bodily exertion, man is constrained to exert the

the powers of the mind. The principle of curiosity implanted in his breast, the encreasing wants of society, and the honors or rewards conferred on those who supply them, give impulse and direction to ingenuity, and are the fruitful source of all the improvements in the arts and sciences, in civilization, and in human reason.

THIS also agrees with historical fact. The priests of Egypt, from their manner of life, and from the situation of that country, were led to the contemplation of speculative truths, before any other body of men of whom we have an authentic account. It is well known in what a high degree of estimation the philosophers of Greece were generally held by their countrymen: and the influence they had in promoting the civilization, happiness and glory of that

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renowned

renowned part of the world, is universally acknowledged.

III. THE progress of the human mind, from ignorance to knowledge, has generally been slow, and not by the most obvious and easy path.

It was almost three hundred years after the first introduction of Geometry into Greece, when the elements of that science were first collected and methodized by Euclid. And there is a circumstance related in history* which perhaps will surprise every young man newly entered on the study of the Mathematics. The circumstance is this: one person found that the three angles of an equilateral plane triangle were equal to two right angles; another afterwards demonstrated the same

* Maclaurin's account of Sir Isaac Newton's discoveries.

same thing with regard to an isosceles triangle ; and it was a third person who shewed that it was true with regard to any plane triangle whatever. Before the time of Euclid, the Conic Sections had been invented by Menechmus ; but it was not till about a hundred and eighty-four years before Christ that they were perfected by Appollonius Pergæus. After forty years the great Hipparchus flourished, and to him Astronomy is more indebted than to any of the ancients ; for he invented spherical trigonometry, and made the first catalogue of the fixed stars. Plato had not only improved geometry, but was the first who applied it to physics, and thus laid the foundation of a solid philosophy. In this, however, the ancients generally failed. They reasoned as accurately indeed as the moderns, but instead of founding their reasonings
on

on facts, they built them on hypothesis and metaphysics. The consequence of this was, that, every philosopher who rose to superior eminence, overturned the system of his predecessor, and erected one of his own, which, in its turn, shared the fate of those which had been erected on a like sandy foundation.

PYTHAGORAS, who lived about two hundred and sixty years before Plato, is said to have understood the true system of the universe. This is perhaps doing too much honour to that great man. For it is not the naked idea of a system, but the development of its elements, which gives a title to the honour of inventing it. Indeed, in my opinion, the great Archimedes, who, it may here be observed, is the parent of all that was known to the ancients in the sciences
of

of Optics and Mechanics, from the manner of his treating arithmetical and geometrical progressions, would have as good a right to the glory of the invention of the Logarithms, as Pythagoras has to what is attributed to him respecting the true system of the world.

IV. FROM the time of Diophantus of Alexandria, the inventor of Algebra, till that of Copernicus and Galileo, a space of eleven hundred years, the history of the sciences presents us with an almost uninterrupted blank. The eyes of the human mind, during that long and gloomy night, seem to have been sealed up in the most profound sleep. The Roman empire, crushed under its own weight, buried in its ruins the sciences and the arts—those monuments which the genius of man had been rearing to the glory of
human

human nature for more than a thousand years. Upon those ruins, a spiritual tyrant erected his throne, and, with the most impious domination, enslaved the free, the heaven-born soul of man. Burdened and debased by superstition and prejudice, that being, on whom the Parent of Truth had stamped his own image, wandered in the wildest labyrinths of error. The philosophers of this period, if it be not profanation to call them by that name, employed themselves in meditating and disputing on words of which neither they nor others ever understood the meaning, in fruitless researches after the philosophers' stone, and in vain predictions of future events from the aspects of the heavenly bodies. The few individuals who cultivated the powers of their own mind, and directed them to pursuits worthy of a rational being, were
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only like the stars of the night, twinkling through the temporary opening of a thick dark cloud which they could not dispel.

V. THE active genius of man, however, was not to be held in everlasting chains. A spirit of enterprise was at length roused by superstition itself. * This spirit was afterwards greatly strengthened and extended, by the successful expedition of Vafquez de Gama round the Cape of Good Hope, and by the fortunate discovery of this vast continent by Christopher Colombo.

IN the mean time, the sciences and the fine arts were raised from their graves by the Italians, the descendants of those very barbarians by whom they had been buried. And commerce,

* In the Crusades against the Infidels.

commerce, literature and the imitative arts diffused a gleam of light and civil liberty and happiness over the western part of the old world.

IN the sixteenth century, the works of the ancient philosophers, particularly those on mathematics and astronomy, which had been preserved by the Arabs, * were brought to Italy and translated. The art of printing, the invention of the preceding century, opened the eyes of the European nations; and they began to shake off the shackles with which they had been held in bondage for so long a series of ages.

VI. COPERNICUS, a native of Thorn in Prussia, superior to the deep rooted

* The Arabs, in their treaties with the Emperors of Constantinople, were wont to stipulate for copies of the works of the ancients.

rooted prejudices of his time and of his senses, was the personage to whom the world is indebted for pointing out, in a distinct and particular manner, the true system of the universe. His book on the Celestial Revolutions was not published till after his death, which happened in the year one thousand five hundred and forty-three. It was with the utmost difficulty, and not till he lay on his death-bed, that his friends obtained his consent to its publication; for he knew too well what treatment he must have met with, from the arrogant ignorance and bigotry of his contemporaries.

GALILEO, who was born at Pifa in Italy, soon after demonstrated what Copernicus had described. For this heinous crime he was cited to appear before the Inquisition at Rome, and that abominable tribunal obliged
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him to renounce the genuine offspring of his reason, and imposed upon him, when they set him at liberty, the penance of repeating at stated times, and for a series of years, the seven penitential psalms.

HERE it would be unpardonable to pass over in silence the name of Sir Francis Bacon, Lord Verulam, whose sagacity pointed out the path of science, in which Galileo advanced with a secure and rapid pace. I do not think, however, that the name of Bacon, in the list of great men, should precede that of Galileo. For although the former seemed to sketch out the plan of the edifice of science, it was the latter who, by his superior knowledge in geometry, was enabled to put that plan in execution.

THE first telescope was accidentally
invented

invented by a spectacle-maker in Holland. As soon as the news of this invention reached Galileo, he set himself to work, and, in a short time, completed one much superior; and had the honor of being the first who applied it to the purposes of Astronomy. The discoveries which by means of this improvement he was enabled to make, surprised and delighted his contemporaries. In consequence hereof the astronomical dreams of Aristotle and Ptolomey vanished, and the truth of the Copernican system was established on the firmest foundation.

EXPERIMENT and observation, and the geometrical spirit which Galileo introduced into natural philosophy, are the same which, at this day, accompany the researches into truths of every kind. And the laws of the
fall

fall of heavy bodies, which he discovered and demonstrated, are the fruitful source of all the improvements that have since been made in statics and mechanics.

UNDER so great a master, Cavalieri, Torricelli and Viviani made admirable progress. The first, without knowing it, prepared the calculus of infinitesimal quantities; the second, by his discovery of the barometer, added another branch to science—that of the air; and the last, with the Academia del Cimento at Florence, reduced experimental philosophy to system. *

ABOUT the same time appeared Des Cartes, who, by promoting the science of Algebra, and chiefly by applying algebra to geometry, has merited

* Frisi, Elogio del Galileo.

merited the title of a great philosopher—an appellation which will be continued to him by grateful posterity, notwithstanding his false and exploded dreams respecting the system of the world.

VII. THE most simple of the laws of Nature—that of repose or equilibrium, has been known for many ages. But the laws of Motion, which are the foundation of natural philosophy, were unknown to the ancients. How could they know them? Mistaking quibble for reason, and metaphysics for science, one party of them involved their speculations on motion, in sophistry, and the other denied its existence. Des Cartes sought for its laws in vain. At length, however, as if time had brought the affair to maturity, the laws of motion appeared at once from all parts of Europe. They

They were all discovered at the same time by Huygens, Wallis and Wren.*

HUYGENS, by applying the pendulum to time-pieces, of which however he owed the first hint to Galileo, and, by discovering the theory of centrifugal forces, promoted, in an eminent degree, the advancement of the sciences. And Kepler, a man of the most penetrating genius, by means of the astronomical observations made by Tycho Brahe, his instructor, happily discovered the form of the orbits, and the law of the revolutions of the planets.

VIII. SUCH was the state of science, when Isaac Newton, a man without an equal in the history of human genius, appeared to the astonished world.

FROM

* Maupertuis, Oeuvres.

FROM the mutual gravitation of matter, and from the laws of that gravitation, of which the glory of the discovery and demonstration is entirely his own, he calculated the quantity of matter and the density of the sun and of several of the planets. He explained, upon the same principles, the laws of the planetary system which Kepler had found out. He shewed also that the comets differed essentially from the planets in nothing but the excentricity of their orbits, and he was the first who attempted to compute the times of their periodical revolutions.* From the same principle

* The ancients, and the moderns too until Sir Isaac Newton's time, generally believed the comets to be meteors sent by the Almighty to portend some sad disaster. Seneca the philosopher, with a sagacity greatly to his honor, predicted that the time would come in which mankind would entertain juster notions on the subject. *Veniet tempus, says he, in quo posteri nostri, nos tam aperta ignorasse, mirabuntur.*

principle of gravity he accounted for the ebbing and flowing of the sea.

OPTICS were likewise amazingly improved by him. For before his time the most remarkable properties of light and colours were entirely unknown.

WHAT enabled this great man to unravel the mysteries of nature with such wonderful success, was his skill in the mathematics, the bounds of which he extended beyond all expectation. Indeed, if we consider the ingenuity, the simplicity and the extent of the calculus of fluxions, we may affirm that he did more for the advancement of pure mathematics, than all that had gone before him.

REJECTING hypotheses and metaphysical visions, this prince of philosophers

sophers established the science of nature on the eternal foundation of facts or experiment, and by means of his own mathematics, reared a wonderful and immovable superstructure, which he carried so near to perfection, that little seems left to be done by posterity. A series of above sixty years, in the most enlightened period of the world, has produced little more than a superior degree of polish and strength to the fabric.

PERHAPS no man was ever more praised than Sir Isaac Newton; and perhaps no man ever deserved so much to be praised. * For, to the
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* He was the idol of his nation while he lived. He will be their boast for-ever. All the poets of any note, who have written since his time, have celebrated his praise. Pope says of him,

Nature and nature's laws lay hid in night,

GOD said, LET NEWTON BE! and all was light.

And Voltaire, addressing the angels in a poem prefixed
to

most penetrating sagacity, the most exalted genius, and the most unwearyed patience, he joined the highest degree of modesty, temperance and uprightness. He loved science for its own sake, and because it conducted him to the Supreme Cause of All. And so far was he from courting fame, that when the invention of the Fluxionary Calculus, the most luminous that had ever been made in mathematics, was claimed by Leibnitz, a man inferior to Newton alone, he left his cause to itself, and thereby shewed that he was even superior to the glory of so great a discovery. †

IN

to Madame de Chastelet's explanation of Newton's Principia, has these verses,

*Confidens du Tres-Haut, Substances eternelles,
Qui parez de vos feux, qui couvrez de vos ailes ;
Le trône où votre Maître est assis parmi vous !
Parlez !—Du grand Newton n'etiez vous point jaloux ?*

† The Royal Society of London however selected judges from different nations on purpose to enquire into the affair. Those judges decided in Newton's favor, and Europe acquiesced in the decision.

IN contemplating this singular character, the soul of man, while it feels dignified and transported, congratulates itself that so great an ornament to humanity has existed. *

SINCE

* He was interred in Westminster Abbey, and a noble monument was erected to his memory in the most conspicuous part of that church, upon which is the following inscription :

H. S. E.

ISAACUS NEWTON EQUES AURATUS
 QUI ANIMI VI PROPE DIVINA
 PLANETARUM MOTUS FIGURAS
 COMETARUM SEMITAS OCEANIQUE AESTUS
 SUA MATHESI FACEM PRÆFERENTE
 PRIMUS DEMONSTRAVIT
 RADIORUM LUCIS DISSIMILITUDINES
 COLORUMQUE INDE NASCENTIUM PROPRIETATES
 QUAS NEMO ANTE SUSPICATUS ERAT
 PERVESTIGAVIT
 NATURÆ ANTIQUITATIS SACRÆ SCRIPTURÆ
 SEDULUS SAGAX FIDUS INTERPRES
 DEI O. M. MAJESTATEM PHILOSOPHIA APERUIT
 EVANGELII SIMPLICITATEM MORIBUS EXPRESSIT
 SIBI GRATULENTUR MORTALES
 TALE TANTUMQUE EXTITISSE
 HUMANI GENERIS DECUS.
 NAT. XXVI. DEC. A. D. MDCXLII. OBIIT MART. XX. MDCCXXVI.

SINCE the death of Sir Isaac Newton, the different branches of the pure mathematics, particularly the inverse method of fluxions, which opens a boundless field for investigation, have been very much improved. Of this improvement, the greatest share of the praise is due to Euler, D' Alembert and De la Grange. Euler was a native of Switzerland, which has produced several mathematicians of the first note. D' Alembert was born in France, where the mathematics are a more fashionable study than in any other country. And De la Grange is an honor to Italy, ~~that~~ ~~part of the earth~~ which, from its having been the scene of the noblest actions, and the mistress of Europe in the arts and sciences and in civilization, is, in the eyes of a philosopher,

pher, the most interesting spot on the surface of the globe. *

I SHALL conclude this part of my subject by observing that the physical part of Astronomy has within these few years been advanced far beyond our hopes by the astonishing improvement of the telescope in the hands of William Herschel, a native of Hesse in Germany. †

HAVING given a brief account of the origin, progress and chief promoters of the mathematical sciences; I come now to speak of their importance,

* Had it been consistent with the author's plan, he might have mentioned the share which Regiomontanus, Fermat, Wallis, James Gregory, John and Daniel Bernoulli, the Marquis de L'Hôpital, Bradley, Clairaut, De la Caille, Maclaurin, and some others, have had in the progress of the sciences.

† This gentleman receives a liberal pension from the king of Great-Britain, and the University of Edinburgh have done themselves the honor to make him a Doctor of Laws.

tance, and of the advantages derived from them.

I. THE mathematical sciences, independently of their application to any particular purpose, are of the utmost consequence to the student.

THE terms made use of in the mathematics are clearly and exactly defined. None but self-evident truths are admitted as first principles. From a single known principle we deduce, by the most solid ratiocination, a thousand unknown truths, which, in their turn, become principles, and serve as the foundation of an infinite number of others. On this account there is no occupation so well adapted as the study of this science, to brighten and enlarge that reasoning power which forms the most distinguishing feature of man. For those
who

who are accustomed to the most clear and undeniable principles, and to the most accurate demonstrations, must necessarily be the best judges of reasoning of every kind.

So necessary, in the estimation of the philosophers of antiquity, was the knowledge of geometry to the successful prosecution of other branches of science, that they inscribed over the doors of their academies, *None who is ignorant of geometry is permitted to enter here.* And we are told by Dionysius of Halicarnassus, that Xenocrates said to a young man unacquainted with this science, who desired to be admitted to the study of philosophy, *Apage ! apage ! anfas philosophiæ non habes.*

BUT the mathematics tend to form the morals, as well as to improve the intellectual

intellectual faculties of youth. One of the great principles of the corruption of all mankind, is the strong propensity and attachment they feel to the objects of sense. Now the study of the mathematics being an occupation purely intellectual, if the minds of young people can be brought to be captivated with it, they will proportionably lose their attachment to sensual pleasures, and learn to relish enjoyments of a nature infinitely more refined. It inspires us with a sense of order, of regularity and of dignity. And it is well known how powerful an influence a just sense of these has on our moral conduct. It enables us to bridle the fallies of imagination, to moderate our passions and our temper, and to estimate things according to their intrinsic value. And by teaching us the scantiness of human knowledge, it hum-
bleth

bleth our pride, and disposeth us to suffer our neighbour to enjoy his opinions in peace, particularly in things not susceptible of demonstration, or not warranted by indubitable testimony. Here truth appears like the sun in a cloudless sky, whereas in many other parts of human learning it is enveloped in mist and obscurity. Every mind capable of attention must therefore be pleased with the mathematics; for, corrupted and degenerated as we are, we still possess an ardent love of truth.

Now this detachment from sensible objects, and the cultivation of the love of truth, are very considerable steps towards virtue. And I agree most cordially with a celebrated writer * when he says, “I should not think the most exalted faculties of the human

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* Junius.

man mind a gift worthy of the Divinity, nor any assistance in the improvement of them a subject of gratitude to my fellow-creature, if I were not satisfied that really to inform the understanding, corrects and enlarges the heart."

It is said by some that this science tendeth to make men sceptics in every thing which is not susceptible of mathematical demonstration, and therefore, that, instead of being useful, it is, in the highest degree, dangerous to the interests of morality and religion. This is a heavy charge indeed: but fortunately it is not founded on fact or on the nature of things. There have been none distinguished for their mathematical knowledge, who were not also remarkable for the purity of their morals, and the inoffensiveness of their deportment.

portment. Napier, Pascal and Newton, than whom their respective countries never produced greater geniuses for the mathematics, were all eminent for their uprightness, their piety, and their zeal for the christian religion.

It is the property of errors to clash with one another; but truth, which is simple and eternal like its Author, can never be opposed to itself. Mathematical truth, therefore, is perfectly consistent with every other species of truth. Is there no demonstration but what is mathematical? Do not mathematicians as well as others feel within themselves, are they not from what they see around them, irresistibly forced to confess the existence and attributes of the Deity? From this first principle do we not deduce, by the most accurate reasoning, that this Being ought to be loved and worshipped,

worshipped, and likewise infer a thousand other consequences, of the truth of which the mind is as firmly convinced, as of the truth of any mathematical proposition whatever? This first principle of morality has indeed been denied by a few individuals: the truth of the first principles of the mathematics, has also been questioned. But such as quibble in matters so self-evident and so important, deserve to be pitied, not answered.

INSTEAD of these sciences being hurtful to religion and morality, they will be found to be of the greatest advantage to them. Natural philosophy in particular, by leading us in a satisfactory manner, to the knowledge of one almighty, all-wise and all-good Being, who created, preserves and governs the universe, is the very hand-

hand-maid of religion. Indeed I consider a student of that branch of science as engaged in a continued act of devotion. And were it possible that such a person should be wanting in reverence to the author of all, he would deserve to be ranked with those whose understanding God hath taken away. * This immense, beautiful and varied universe, is a book written by the finger of Omnipotence, and raises the admiration of every attentive beholder. But it is written in the language of geometry, without the knowledge of which, the excellencies of the workmanship, and the skill of the great Artist, can be but imperfectly understood. †

II. SINCE the subjects of mathematical enquiry are spaces, times, velocities,

* *An undevout Astronomer is mad.* YOUNG.

† Galileo, Saggiatore.

velocities, weights, measures, in short every thing susceptible of augmentation and diminution, these sciences are so intimately connected with all the arts of procuring the necessaries, conveniencies and comforts of life, that the cultivation of them is of the highest importance.

It is by them that we are enabled to determine with accuracy, the length of the year, and its distribution into seasons: that we have invented and improved to a surprizing degree, the machines for the equable measurement of time: that we calculate the rising and setting and eclipses of the sun and moon and other heavenly bodies: that we have found out the true figure and dimensions of the earth: that we conduct with certainty and safety, vessels over the pathless ocean: that we construct machines which save
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an amazing expence of labor and time : that we assist enfeebled vision, and wonderfully improve the most perfect : that we make peaceful divisions of landed property : that we improve the means of self-defence, and of carrying on war : that we build commodious and stately habitations : that we digest the events of history in their proper order : that we perfect the instruments of music, and subject music to its proper laws.

I COULD mention a great many more purposes to which these sciences are applicable, but the above enumeration is sufficient to convince every one of their vast extent and utility. But here an objection presents itself. What necessity is there for so much mathematics, so much science? May not almost all the purposes you have mentioned, be accomplished without
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so much mathematics? If we have mathematics enough to be able to measure our fields, and to do other necessary things, is not that sufficient? Even Socrates, whose name should not be pronounced but with veneration, was wont to talk in this strain. What a happy thing would it be, however, if all the objections to truth could be as easily answered as this!

In the first place Socrates was not a proper judge in this matter, for he was not a mathematician. If he had been one, he would have ranked the study of this science among the necessities of life. For so strong is the attachment to it, that those who have made progress in it, feel, that there is not a single instance in which that attachment has been entirely dissolved, and very few instances in which it has been even weakened to any considerable

able degree. And were Socrates now alive, and informed that the most subtile parts of the mathematics, as well as the nicest astronomical observations, are necessary for preparing the tables for calculating the longitude at sea, and that thereby the lives of many of his fellow-creatures are preserved, he would not say that "no more geometry is necessary than may enable us to measure our fields."

With regard to the cultivation of the mathematics beyond the visible purposes of applying them, we have one very remarkable instance which will not be denied to be a very good apology for doing it. The ancient geometers perfected the curves called Conic Sections, without knowing that the planets revolved round the sun in one of those curves. Why, therefore, may not we pursue this study,

as far as the intellect which our heavenly Father hath given us will permit, and by this mean add some more steps to a ladder on which posterity may mount to a height which at present surpasses our conception.

THERE have been some individuals, of a very different stamp from Socrates, who endeavoured to degrade the mathematics in the estimation of the world. The chief of these were Aristippus, Epicurus, the Abbé des Fontaines and Joseph Scaliger the critic.

It is no way surprising that a study which requires a strong and continued exertion of the mind, should prove an ungrateful task to a voluptuous man. And such was Aristippus.

EPICURUS and his follower Lucretius, who believed that the sun and moon were no bigger than they appeared to the eye, should have learned at least the elements of geometry, before they presumed to slander it.

THE Abbé des Fontaines thought the study of the mathematics rather beneath the dignity of a man of genius, and he was wont to say that to be a great mathematician no more was requisite than to be very diligent, and to live very long. Now he was certainly mistaken. For Clavius, Wolfius and Renaldini, although among the most voluminous, are far from being among the most esteemed of that profession; and Leibnitz, Des Cartes and Newton were young when they made their greatest discoveries. Indeed it is a general fact that the greatest mathematicians have shewn themselves

themselves to be such, in their youth. But we need not wonder that this Abbé, with whom exactness and equity are said * to have been virtues purely speculative, should endeavour to traduce a science of which he was as ignorant as his brethren just mentioned.

As to Joseph Scaliger it is observable that it was not until after an unsuccessful attempt to solve some geometrical problems, he became an enemy to geometers. From this we may infer that one may be a very good critic in the languages, without having a mathematical genius. To be the first more memory than judgment is required; to possess the latter more judgment than memory is necessary.

HAVING

* Montucla, Histoire des Mathematiques.

HAVING now finished what I proposed to say on this subject, I beg leave to trespass on your patience for a few minutes more, while I address myself to the Students and to the Trustees of the College.

To the Students.

Young Gentlemen, What I have said respecting the cultivators and the importance of the mathematical sciences, I hope will make such an impression on your minds, as will induce you to apply to them with unremitting ardor. The circumstances and situation of this country should serve as an additional motive to application. In the European countries the customs and manners of the people are in a great measure settled by long and inveterate habit. In this country they are in a very fluctuating state.

state. In the former the influence of particular pursuits in learning is imperceptible, and slow in its operation. In the latter it is rapid and very discernible. It is therefore of the last importance that you should improve your minds to the greatest advantage; and of all the branches of human science, there is none better adapted to accomplish this end than what I recommend to you.

MATHEMATICAL knowledge is generally supposed to be acquired with difficulty. I can assure you, however, that the difficulty arises rather from want of attention than from want of sagacity in those who make the attempt. With a firm resolution and a persevering diligence, you cannot fail of success. Without them, the greatest genius would be of no avail.

IT

It gives me a great deal of pleasure, Gentlemen, to have occasion to observe, in this public manner, that a considerable majority of those of you who have studied the mathematics under my direction, have acquitted themselves even better than my expectations, which, believe me, were very sanguine. And I hope this testimony of approbation will prove another inducement to your future exertions. I beg that you, gentlemen, who are about to receive the honors of college, and to enter into the world, will by no means imagine that you have yet acquired a sufficient knowledge of this or of any other subject of your studies; for a College Education is intended rather to sketch out the plan, and to lay the foundation, than to complete the fabric of the liberal arts and sciences. And I conjure all of you to remember that,

whatever

whatever be the talents which the Father of mankind has bestowed upon you, and however much you may improve those talents, it should be the chief and invariable study of your lives to employ them in doing good to your fellow-creatures ; for, of all the curses that can befall humanity, that of the misapplication of genius is the greatest, and the most pernicious to the individual and to society.

To the Trustees.

MR. President and Gentlemen of the honorable Corporation of Trustees, It is with the deepest sense of gratitude that I return you thanks for your unanimous appointment of me to the Professorship of Mathematics and Natural Philosophy. As I consider the Duties of my station,
and

and the happiness of my life to be inseparably connected, I trust you are firmly convinced that no exertions on my side, shall be wanting to justify your choice, and to merit your approbation. I feel a very high degree of satisfaction in being a member of a Faculty, whose names will be for-ever dear to the wellwishers to the cause of learning and of the liberties of mankind, and in having it in my power to unite with them in giving the tone to the turn of thinking of the future legislators of America. It is your province, Gentlemen, to co-operate with us in this important business, by replacing such parts of the philosophical apparatus as we were deprived of by the incidents of the war, which was prosecuted

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cuted by our enemies in the true spirit of the Goths and Vandals. *

Address to the Supreme Being.

FATHER of truth and reason and of every thing that lives ! Be pleased to prosper the interests of science and literature in the United States of America : to make those interests ever subservient to the promotion of liberty, happiness and virtue : to preserve this rising and extensive empire from the ill-boding spirit of conquest : to protect this country as a secure and happy asylum to the oppressed

* The British seemed to have a particular antipathy to our Seminaries of learning, and our Presbyterian Churches. As to Princeton College, the American soldiers had their share in the depredations committed on it.

oppressed in all quarters of the globe:
to enlighten the inhabitants of the
eastern hemisphere in the knowledge
of the rights of mankind, and in the
arts of government and peace: to
cause truth and reason at length to
obtain a glorious and everlasting vic-
tory over error and violence; and to
instruct all the nations of the world
in the way of uprightness and felicity.
Amen.

oppressed in all quarters of the globe
to enlighten the ignorance of the
Eastern Hemisphere in the knowledge
of the rights of mankind, and in the
arts of government and peace; to
caste truth and reason as lamps to
obtain a glorious and everlasting vic-
tory over error and violence; and to
instruct all the parts of the world
in the way of peace and felicity.



Amen.

